

WHAT IS CLAIMED

1. A display device comprising:

a substrate;

a plurality of parallel source lines and a plurality of parallel gate lines formed over said substrate, said source line and gate lines being arranged relative to one another to form a matrix of pixel regions over said substrate with each of said pixel regions bounded by two adjacent source lines and two adjacent gate lines;

a plurality of thin film transistors formed over said substrate, at least one thin film transistor disposed at each intersection of said source lines and gate lines in each of said pixel regions;

a first interlayer insulating film formed over said thin film transistors;

a black matrix comprising a light shielding layer formed over said first interlayer insulating film, said light shielding layer disposed to cover completely at least said gate lines;

a second interlayer insulating film formed over said light shielding electrode;

a pixel electrode disposed in each of said pixel regions over said second interlayer insulating film, wherein a periphery of said pixel electrode overlaps with said light shielding electrode to form a capacitor with said light shielding layer, said second interlayer insulating film and said pixel electrode; and

a counter electrode in electrical communication with said light shielding layer, wherein said light shielding layer is electrically connected to a same potential as the counter electrode.

2. A display device according to claim 1 wherein said second interlayer insulating film is interposed between said pixel electrode and said first interlayer insulating film and prevents any direct electrical contact therebetween.

3. A display device according to claim 1 wherein said second interlayer insulating film has a flat upper surface over said light shielding electrode.

4. A display device according to claim 1 further comprising an insulating film comprising silicon oxide formed on said substrate.

5. A display device according to claim 1 wherein said pixel electrode is transparent.

6. A display device according to claim 1 wherein said light shielding layer comprises chromium.

7. A display device according to claim 1 wherein said light shielding layer comprises titanium.

8. A display device comprising:
a substrate;
a plurality of parallel source lines and a plurality of parallel gate lines
formed over said substrate, said source lines and gate lines being arranged relative to one another to form a matrix of pixel regions over said substrate;

a plurality of thin film transistors formed over said substrate, at least one thin film transistor disposed at each intersection of said source lines and gate lines in each of said pixel regions;

a first interlayer insulating film formed over said thin film transistors;

a light shielding conductive layer formed over said first interlayer insulating film, said light shielding conductive layer disposed to cover said gate lines;

a second insulating film formed on said light shielding conductive layer;

and

a pixel electrode disposed in each of said pixel regions over said second insulating film, wherein a periphery of said pixel electrode overlaps with said light shielding conductive layer to form an auxiliary capacitor with said light shielding conductive layer, said second interlayer insulating film and said pixel electrode,

wherein a periphery of said pixel electrode is overlapped with corresponding one of said source lines.

9. A display device according to claim 8 wherein said thin film transistors have a top-gate structure.

10. A display device according to claim 8 wherein said pixel electrode is transparent.

11. A display device according to claim 8 wherein said light shielding conductive layer constitutes a black matrix.

12. A display device comprising:

a substrate;

a plurality of gate lines and a plurality of source lines formed over said substrate;

a plurality of pixel regions defined by said gate lines and said source lines;

a plurality of thin film transistors formed over said substrate, at least one thin film transistor being disposed in each of said pixel regions;

a first insulating layer formed over said thin film transistors;

a light shielding conductive layer formed over said first insulating layer, said light shielding conductive layer disposed to cover at least said gate lines;

a second insulating layer formed over said light shielding conductive layer;

a pixel electrode formed over the second insulating layer in each of said pixel regions,

wherein said pixel electrode is overlapped with said light shielding conductive layer with said second insulating layer interposed therebetween to form a capacitor, and a periphery of said pixel electrode being overlapped with the source lines and the gate lines which define the corresponding pixel region, and said light shielding conductive layer extends between said pixel electrode said gate lines.

13. A display device according to claim 12 wherein said thin film transistors have a top-gate structure.

14. A display device according to claim 12 wherein said pixel electrode is transparent.

15. A display device according to claim 12 wherein said light shielding conductive layer constitutes a black matrix.

16. A display device comprising:

- a substrate;
- a plurality of parallel source lines and a plurality of parallel gate lines formed over said substrate, and source lines and gate lines being arranged relative to one another to form a matrix of pixel regions over said substrate;
- a plurality of thin film transistors formed over said substrate, at least one thin film transistor disposed at each intersection of said source lines and gate lines in each of said pixel regions;
- a first interlayer insulating film formed over said thin film transistors;
- a light shielding conductive layer formed over said first interlayer insulating film, said light shielding conductive layer disposed to cover said gate lines;
- a second insulating film formed on said light shielding conductive layer;
- and
- a pixel electrode disposed in each of said pixel regions on said second insulating film, wherein a periphery of said pixel electrode overlaps with said light shielding conductive layer to form an auxiliary capacitor with said light shielding conductive layer, said second interlayer insulating film and said pixel electrode, wherein a periphery of said pixel electrode is overlapped with corresponding ones of gate lines and said light shielding conductive layer extends in an overlapped portion between the pixel electrode and said one of the gate lines.

17. A display device according to claim 16 wherein said thin film transistors have a top-gate structure.

18. A display device according to claim 16 wherein said pixel electrode is transparent.

19. A display device according to claim 16 wherein said light shielding conductive layer constitutes a black matrix.

20. A display device comprising:

- a substrate;
- a plurality gate lines and a plurality of source lines formed over said substrate;
- a plurality of pixel regions defined by said gate lines and said source lines;
- a plurality of thin film transistors formed over said substrate, at least one thin film transistor being disposed in each of said pixel regions;
- a first interlayer insulating film formed over said thin film transistors;
- a light shielding conductive layer formed over said first insulating layer, said light shielding conductive layer disposed to cover said gate lines;
- a second interlayer insulating film formed over said light shielding conductive layer;
- a pixel electrode formed over the second insulating layer in each of said pixel regions; and

a counter electrode in electrical communication with said light shielding conductive layer, wherein said light shielding conductive layer is electrically connected to a same potential as said counter electrode,

wherein said pixel electrode is overlapped with said light shielding conductive layer with said second insulating layer interposed therebetween to form a capacitor, and a periphery of said pixel electrode is overlapped with the source lines and the gate lines which define the corresponding pixel region.

21. A display device according to claim 20 wherein said thin film transistors have a top-gate structure.

22. A display device according to claim 20 wherein said pixel electrode is transparent.

23. A display device according to claim 20 wherein said light shielding conductive layer constitutes a black matrix.